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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,294	09/27/2001	Oleg D. Lavrentovich	KSU.P202	5056

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RENNER, KENNER, GREIVE, BOBAK, TAYLOR & WEBER
FOURTH FLOOR
FIRST NATIONAL TOWER
AKRON, OH 44308

EXAMINER	
SEFER, AHMED N	

ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/966,294	LAVRENTOVICH ET AL.	
	Examiner	Art Unit	
	A. Sefer	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The amendment filed on December 4, 2003 has been entered; no new claims have been added.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites the limitation "the curable prepolymer". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 9 and 10 are rejected under 35 U.S.C. 102(a) as being anticipated by Kumar et al. (WO 00/49452).

Kumar et al disclose in figs. 1-11 a liquid crystal device comprising a pair of opposed substrates 82 having a gap therebetween; a liquid crystal material 54 disposed in said gap; and a polymer micro-structures 58 formed between said substrates, wherein the micro-structures are formed by polymerizing a prepolymer, and wherein the micro-structures affixed to said at least one of the substrate (as in claim 2) have a shape and spatial location determined by the director field of said liquid crystal material.

As for claims 3 and 4, Kumar et al disclose an alignment layer 28 or a polymer layer (as in claim 4) disposed on at least one of said substrate.

As for claims 9 and 10, Kumar et al disclose (see pages 7 and 8, lines 28-32 and 3-15) a smectic liquid crystal material and UV-curable prepolymer (as in claim 10).

6. Claims 1-4, 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu USPN 6,203,723.

Hsu discloses in figs. 1-4 a liquid crystal device comprising a pair of opposed substrates having a gap therebetween; a liquid crystal material 2 disposed in said gap; and a polymer micro-structures 9 formed between said substrates, wherein the micro-structures are formed by polymerizing a prepolymer, and wherein the micro-structures have a shape and spatial location determined by the director field of said liquid crystal material.

As for claims 9 and 10, Hsu discloses (see abstract and col. 1, lines 34-60) a smectic liquid crystal material and UV-curable prepolymer (as in claim 10).

7. Claims 11-15 are rejected under 35 U.S.C. 102(a) as being anticipated by Kumar et al. (WO 00/49452).

Kumar et al disclose (see figs. 1-11 and pages 7 and 8, lines 28-32 and 3-15) a method for fabricating a liquid crystal device having polymer micro- structures 58, the method comprising the steps of preparing a mixture comprising a liquid crystal material and a prepolymer; providing a first and second cell wall structure 52, said first and second cell wall structures optionally having electrodes 26 disposed on facing sides of said first and second cell wall structures, and, optionally having an alignment layer 28 disposed on at least one of said electrodes; disposing said mixture into a space between the first and second cell wall structures; causing said liquid crystal material to assume a predetermined orientation with a non-uniform spatially distorted director field; and exposing said mixture to conditions which cause polymerization of the prepolymer and formation of polymer microstructures between the cell walls.

As for claim 12, Kumar et al disclose (see page 9, lines 6-15) a mixture comprising a liquid crystal material and a prepolymer comprising prepolymer within the range recited in the claim.

As for claims 13 and 14, Kumar et al disclose (see pages 7 and 8, lines 28-32 and 3-15) a smectic liquid crystal material and UV-curable prepolymer (as in claim 14).

As for claim 15 Kumar et al disclose in fig. 1first and second cell wall structures have electrodes 26 disposed thereon, and wherein said step of causing said liquid crystal material to assume a predetermined orientation with a non-uniform spatially distorted director field comprises applying a voltage across said electrodes.

8. Claims 16-23 are rejected under 35 U.S.C. 102(a) as being anticipated by Kumar et al. (WO 00/49452).

Kumar et al disclose (see figs. 1-11 and pages 7 and 8, lines 28-32 and 3-15) a method for forming polymer micro-structures, the method comprising the steps of: preparing a mixture comprising a liquid crystal material and a prepolymer; providing a first and second cell wall structure 52 comprising electrodes 26 (as in claim 18) or alignments (as in claim 19); disposing said mixture into a space between the first and second cell wall structures; causing said liquid crystal material to assume a predetermined orientation with a non-uniform spatially distorted director field; and exposing said mixture to conditions which cause polymerization of the prepolymer and formation of polymer microstructures between the cell walls.

As for claim 17, Kumar et al disclose UV-curable prepolymer, wherein the polymerization comprises UV radiation.

As for claim 20, Kumar et al disclose (see page 9, lines 6-15) a mixture comprising a liquid crystal material and a curable prepolymer comprising curable prepolymer within the range recited in the claim.

As for claim 21, Kumar et al disclose (see pages 7 and 8, lines 28-32 and 3-15) a smectic liquid crystal material.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 5, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Scherer et al. ("Scherer") 6,208,398.

Hsu discloses the device structure as recited in the claim, but does not disclose a homogenous planar geometry produced by an alignment.

Scherer discloses (see figs. 1-4 and abstract) a liquid crystal device comprising a pair of opposed substrates having a gap therebetween; a liquid crystal material 66 disposed in said gap; and alignment layer 95 disposed on at least one of said substrate, wherein said alignment layer produces homogenous planar geometry of the director field or homeotropic geometry of the director field (as in claim 7) or a patterned geometry of the director field with different alignment properties at different regions of the cell (as in claim 8).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Scherer's teachings with Hsu's device since that would provide a smart pixel arrays.

11. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Acosta et al. ("Acosta") USPN 6,512,569.

Hsu discloses the device structure as recited in the claim, but does not disclose a homogenous planar geometry produced by an alignment.

Acosta discloses in figs. 4-8 a liquid crystal device comprising a pair of opposed substrates having a gap therebetween; a liquid crystal material 3 disposed in said gap; and alignment layer 2/2' disposed on at least one of said substrate, wherein said alignment layer produces homogenous planar geometry of the director field or a homogenous tilted geometry of the director field (as in claim 6) or homeotropic geometry of the director field (as in claim 7) or a

patterned geometry of the director field with different alignment properties at different regions of the cell (as in claim 8).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Acosta's teachings with Hsu's device since that would provide a smart pixel arrays.

12. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Molsen et al. ("Molsen") UK 2 329 481.

Hsu discloses the device structure as recited in the claim, but does not disclose a homogenous planar geometry produced by an alignment.

Molsen discloses (see figs. 7 and 8) a liquid crystal device comprising a pair of opposed substrates 12/13 having a gap therebetween; a liquid crystal material disposed in said gap; and alignment layer 16/17 disposed on at least one of said substrate, wherein said alignment layer produces homogenous planar geometry of the director field or a homogenous tilted geometry of the director field (as in claim 6) or homeotropic geometry of the director field (as in claim 7).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Molsen's teachings with Hsu's device since that would eliminate irreproducible characteristics as taught by Molsen.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2800.

ANS
March 21, 2004

NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800